



Fermilab

\bar{p} Note #377

Leybold - Heraeus 270 Liter/Second Ion Pump

Acceptance Test

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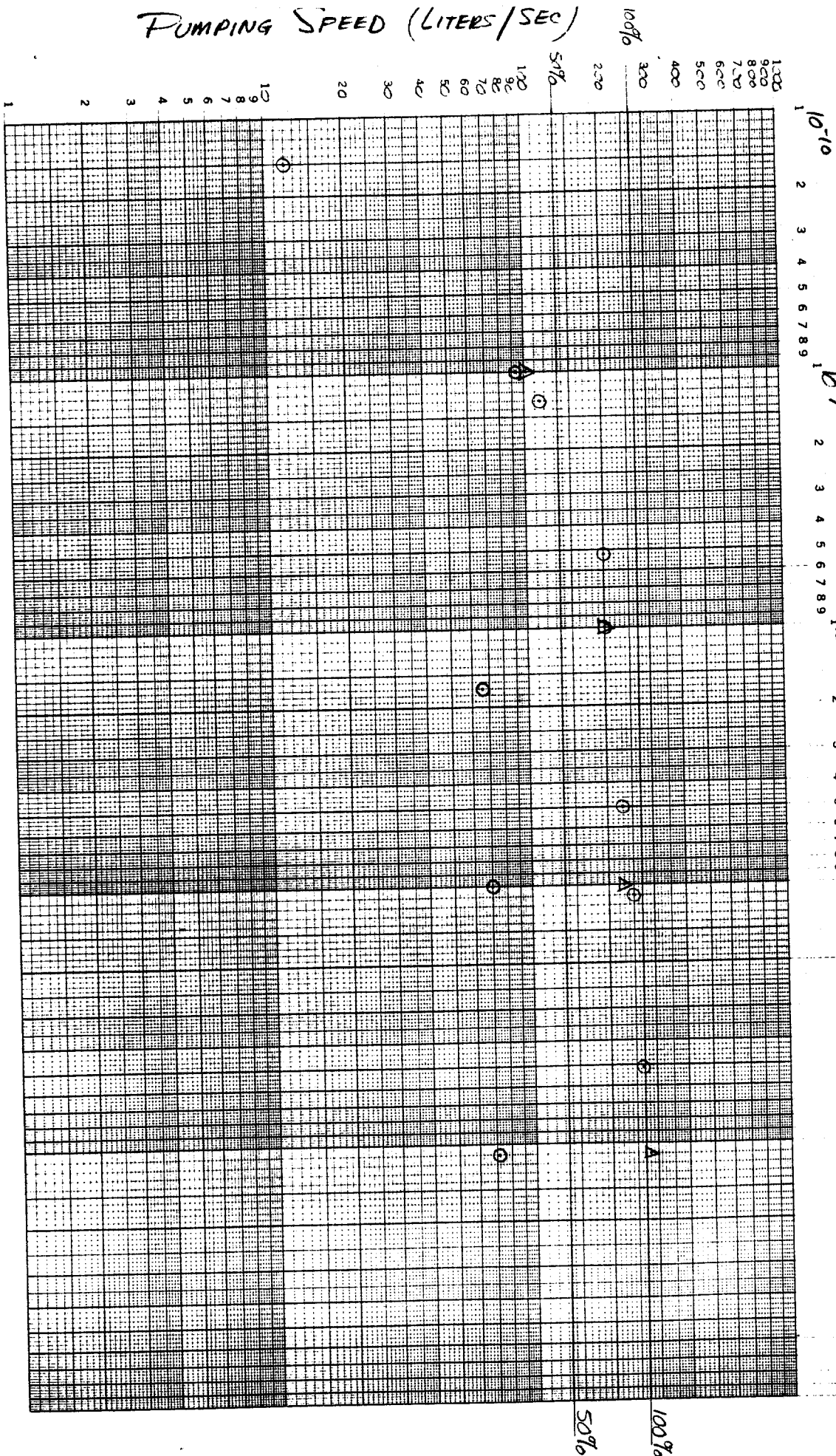
LEYBOLD - HERAEUS 270 LITER/SECOND ION PUMP ACCEPTANCE TEST

A prototype Leybold-Heraeus 270 l/s ion pump was received by Fermilab in February 1984 to be tested for compliance with specifications as given in Fermilab Specification No. 8000-ES-119233. The testing was done in accordance with the procedures outlined in section 3.0.

The pump was inspected electrically to check for proper connections, continuity, and grounding. The bake out heaters were installed according to the vendor's instructions. Before breaking the vacuum seal, a prototype power supply of Fermilab design was used to power the ion pump. The ion pump was found to be leak tight by virtue of the fact that the pressure in the pump came down to less than 10^{-9} TORR immediately after starting the power supply. A gauss meter was used to check that the stray magnetic field did not exceed 1 gauss at a distance of six inches from the mounting flange.

Of particular importance was the performance of the ion pump in regards to pumping speeds at various pressures. The pumping speed test was conducted according to the procedure outlined in paragraph 3.6 of the Fermilab specification. A Fischer-Mommsen test done was used to measure the nominal pumping speed. The ion pump and test dome were baked at 300°C for 24 hours at a pressure of 10^{-7} TORR. After cooling to room temperature, the ion pump reached an ultimate pressure of 9.0×10^{-11} TORR after five days. The ion pump was then saturated with dry nitrogen gas at a constant pressure of 1.0×10^{-6} TORR for 24 hours. This was done to condition the pump in order to gain more accurate test results under actual working conditions. Measurements were taken at various pressures to determine the pumping speeds in the vacuum ranges that the ion pump will be operating. After completing the test with dry nitrogen, the procedure was repeated using argon gas. Results of the tests are shown in the attached graph.

PRESSURE (Torr)
@ 100 Pump RPM



TEST GAS: Deuterium Nitrogen
FEB 29, 1984 E. F. Fossman

LEGEND - HEREAS (on Pump 2700/sic)
(PROTOTYPE)